

CLAIMS

1. A method of isolating decay fungi which will have a positive effect on non-sterilized wood and/or wood products and/or wood processing by providing a lignocellulosic and/or extractives decrease in the wood and a minimisation or inhibition of the detrimental effects of competitor fungi, the method comprising or including the steps of:
- 1) collection of decay fungi (whether from nature or otherwise);
 - 2) preparation of a cultivation of the decay fungi;
 - 3) subjecting the cultivated decay fungi to a selection process to distinguish desired decay fungi from unwanted fungi, wherein the selection process includes or comprises subjecting the cultivated decay fungi to both:
 - a) a test to establish production of oxidative enzymes; and
 - b) a test to establish the ability of the cultivated decay fungi to outgrow and/or inhibit the development of competitor fungi, and wherein the desired decay fungi will satisfy both tests;
 - 4) isolation of the desired decay fungi.
2. The method according to claim 1 wherein the method additionally includes or comprises the step of identifying the decay fungi at any time.
3. The method according to claim 1 wherein the decay fungi has a minimal deleterious effect on the wood and/or wood products and/or wood processing.
4. The method according to claim 3 wherein the decay fungi has a minimal deleterious effect on cellulose yield and/or polymerisation.
5. The method according to claim 1 wherein the collection of step 1) is from nature.
6. The method according to claim 5 wherein the collection of step 1) is from soil and/or humus.
7. The method according to claim 5 wherein the collection of step 1) occurs on wood and/or tree(s).

8. The method according to claim 7 wherein the collection of step 1) occurs on trees and/or wood of the species *Pinus radiata* and/or on trees and/or wood of *Eucalyptus spp.*
9. The method according to claim 1 wherein the cultivation of step 3) occurs between particulate wood including wood chips, sawdust or the like as a solid cultivation, or in liquid supplemented growth media as a liquid cultivation, or in a combination of both as a semi-solid cultivation.
10. The method according to claim 9 wherein the particulate wood of the solid and/or semi-solid cultivation is *Pinus radiata* or *Eucalyptus spp.*
11. **A biologically pure culture of decay fungi** which will have a positive effect on non-sterilized wood and/or wood products and/or wood processing by providing a lignocellulosic and/or extractives decrease in the wood and a minimisation or inhibition of the detrimental effects of competitor fungi isolated according to the above method.
12. A culture according to claim 11 wherein the decay fungi are of the class Basidiomycetes, order Aphyllophorales.
13. A culture according to claim 12 wherein the decay fungi are selected from the genera comprising *Pleurotus spp.*, *Coriolus spp.*, *Phanerochaete spp.*, *Phlebia spp.*, *Ganoderma spp.*, and/or *Lentinus spp.*
14. A culture according to claim 13 wherein the decay fungi is the *Pleurotus sp.* strain 10-P and/or 24-P and/or the *Coriolus sp.* strain 15-A.
15. A culture according to claim 13 wherein the decay fungi is a strain of *Coriolus versicolor* having all the identifying characteristics of the fungi of AGAL Accession Number NM02/32225.
16. A culture according to claim 11 wherein the decay fungi are of the class Ascomycetes, order Plectoascomycetes.
17. **A biologically pure culture of decay fungi** which when subjected to the steps of:
- 1) preparation of a cultivation of the decay fungi;
 - 2) subjecting the cultivated decay fungi to a selection process to distinguish desired decay fungi from unwanted fungi, wherein the

selection process includes or comprises subjecting the cultivated decay fungi to both:

- a) a test to establish production of oxidative enzymes; and
- b) a test to establish the ability of the cultivated decay fungi to

5 outgrow and/or inhibit the development of competitor fungi, and wherein the desired decay fungi will satisfy both tests;

- 3) isolation of the desired decay fungi;

will, when applied to wood, have a positive effect on non-sterilized wood and/or wood products and/or wood processing by providing a lignocellulosic and/or extractives decrease in the wood and a minimisation or inhibition of the detrimental effects of competitor fungi.

18. A culture according to claim 17 wherein the decay fungi has a minimal deleterious effect on the wood and/or wood products and/or wood processing.

19. A culture according to claim 18 wherein the decay fungi has a minimal deleterious effect on cellulose yield and/or polymerisation.

20. **A method for the preparation of a composition** which will have a positive effect on non-sterilized wood and/or wood products and/or wood processing by providing a lignocellulosic and/or extractives decrease in the wood and a minimisation or inhibition of the detrimental effects of competitor fungi, the method comprising or including the steps of:

- a) isolation of decay fungi as disclosed in the above method;
- b) preparation of a reproductively viable form of said decay fungi;
- c) use of said reproductively viable form of said decay fungi, optionally together with one or more acceptable carriers, diluents, or adjuvants, in the preparation of a composition.

21. The method of claim 20 wherein the isolation step a) and/or the preparation step b) of the method includes the preparation of the decay fungi between solid wood.

22. The method of claim 21 wherein said solid wood comprises raw wood residuals exemplified by but not limited to shavings, sawdust and/or chips.

23. The method of claim 21 wherein the the solid wood is of the same genus and/or species as the wood for pulp production to which the composition is to be subsequently applied.
24. The method of claim 21 wherein the the solid wood is *Pinus radiata* or
5 *Eucalyptus spp.*
25. The method of claim 20 wherein the preparation of step b) of a reproductively viable form of the decay fungi is by massive vegetative reproduction.
26. The method of claim 20 wherein the preparation of step b) occurs
10 between particulate wood including wood chips, sawdust or the like as a solid cultivation, or in liquid supplemented growth media as a liquid cultivation, or in a combination of both as a semi-solid cultivation.
27. The method of claim 26 wherein the particulate wood of the solid and/or semi-solid cultivation is *Pinus radiata* or *Eucalyptus spp.*
- 15 28. The method of claim 20 wherein the carrier is H₂O.
29. **A composition comprising decay fungi** which will have a positive effect on non-sterilized wood and/or wood products and/or wood processing by providing a lignocellulosic and/or extractives decrease in the wood and a minimisation or inhibition of the detrimental effects of competitor fungi,
20 prepared according to the above method.
30. The composition according to claim 29 wherein the composition is liquid.
31. The composition according to claim 29 wherein the composition is solid.
- 25 32. The composition according to claim 29 wherein the decay fungi has a minimal deleterious effect on the wood and/or wood products and/or wood processing.
33. The composition according to claim 32 wherein the decay fungi has a minimal deleterious effect on cellulose yield and/or polymerisation.
- 30 34. The composition according to claim 29 wherein the decay fungi is the *Pleurotus sp.* strain 10-P and/or 24-P and/or the *Coriolus sp.* strain 15-A.

35. The composition according to claim 29 wherein the decay fungi is, or the composition includes, *Coriolus versicolor* AGAL Accession Number NM02/32225.

36. **A method of enhancing wood or wood products quality**, the method
5 comprising or including the steps of:

- a) preparation of a composition comprising or including decay fungi according to the above method;
- b) application of the composition to non-sterilized wood subsequently used for pulp production.

10 37. The method according to claim 36 wherein the application of step b) of the composition is manual and/or automated.

38. The method according to claim 36 wherein the application in step b) of the composition is to non-sterilized wood in the forest and/or storing yard and/or mill.

15 39. The method according to claim 36 wherein the application in step b) of the composition is to non-sterilized wood at a ratio of between about 0.05% and about 5% (w/w) decay fungi/dry weight of wood.

40. The method according to claim 36 wherein the application in step b) of the composition is to non-sterilized wood which has a moisture content of
20 from about 60% to about 80%.

41. The method according to claim 36 wherein the application in step b) of the composition is to non-sterilized wood which comprises logs with or without bark and/or chips.

42. The method according to claim 36 wherein the method includes the
25 step of maintaining the wood to which the composition has been applied under conditions which allow growth of the decay fungi for a term sufficient to allow a minimisation or inhibition of the detrimental effects of competitor fungi.

43. The method according to claim 36 wherein the method includes the
30 step of maintaining the wood to which the composition has been applied

under conditions which allow growth of the decay fungi for a term sufficient to effect a lignocellulosic and/or extractives decrease in said wood.

44. The method according to claim 36 wherein in step b) the composition is applied so as to be in contact with the non-sterilized wood for a period of
5 from about 4 days to about 4 months.

45. The method according to claim 44 wherein in step b) the composition is applied to wood chips so as to be in contact with wood for a period of about 7 days.

46. The method according to claim 36 wherein in step b) the composition
10 is applied so that greater than 50% of the wood is colonized by the decay fungi.

47. The method according to claim 36 wherein the decay fungi is, or the composition includes, *Pleurotus* sp. strain 10-P and/or 24-P and/or the *Coriolus* sp. strain 15-A.

15 48. The method according to claim 36 wherein the decay fungi is, or the composition includes, *Coriolus versicolor* AGAL Accession Number NM02/32225.

49. **The wood or wood products** prepared according to the method of claim 36.

20 50. **A method of improved chemical and/or modified chemical pulping**, the method comprising or including:

- a) preparing a composition comprising or including decay fungi;
- b) applying the composition to non-sterilized wood to be used for pulp production; and
- 25 c) pulping said wood in a chemical and/or modified chemical pulping process.

51. The method according to claim 50 wherein the pulping of step c) is in a kraft and/or modified kraft process.

52. The method according to claim 50 wherein the preparation of step a)
30 of a composition comprising or including decay fungi is by a method according to claim 20.

53. The method according to claim 50 wherein the application of step b) of the composition provides one or more of an increase in pulping efficiency, increased yield, and/or lower kappa numbers.
54. The method according to claim 50 wherein the application of step b) of the composition provides a reduction in pulping energy consumption.
55. The method according to claim 50 wherein the application of step b) of the composition provides a reduction in pulping chemical processing liquor consumption.
56. The method according to claim 50 wherein the application of step b) of the composition is manual and/or automated.
57. The method according to claim 50 wherein the application in step b) of the composition is to non-sterilized wood in the forest and/or storing yard and/or mill.
58. The method according to claim 50 wherein the application in step b) of the composition is to non-sterilized wood at a ratio of between about 0.05% and about 5% (w/w) decay fungi/dry weight of wood.
59. The method according to claim 50 wherein the application in step b) of the composition is to non-sterilized wood which has a moisture content of from about 60% to about 80%.
60. The method according to claim 50 wherein the application in step b) of the composition is to non-sterilized wood which comprises logs with or without bark and/or chips.
61. The method according to claim 50 wherein the method includes the step of maintaining the wood to which the composition has been applied under conditions which allow growth of the decay fungi for a term sufficient to allow a minimisation or inhibition of the detrimental effects of competitor fungi.
62. The method according to claim 50 wherein the method includes the step of maintaining the wood to which the composition has been applied under conditions which allow growth of the decay fungi for a term sufficient to effect a lignocellulosic and/or extractives decrease in said wood.

63. The method according to claim 50 wherein in step b) the composition is applied so as to be in contact with the non-sterilized wood for a period of from about 4 days to about 4 months.

64. The method according to claim 63 wherein in step b) the composition is applied to wood chips so as to be in contact with wood for a period of about 7 days.

65. The method according to claim 50 wherein in step b) the composition is applied so that greater than 50% of the wood is colonized by the decay fungi.

66. The method according to claim 50 wherein the decay fungi is, or the composition includes, *Pleurotus* sp. strain 10-P and/or 24-P and/or the *Coriolus* sp. strain 15-A.

67. The method according to claim 50 wherein the decay fungi is, or the composition includes, *Coriolus versicolor* AGAL Accession Number NM02/32225.

68. A pulp prepared according to the method of any of claims 50 to 65.

69. A biologically pure culture of *Coriolus versicolor* AGAL Accession Number NM02/32225.

70. The use of *Coriolus vesicular* AGAL Accession Number NM02/32225 in a composition according to any of claims 29 to 35.

71. The use of *Coriolus vesicular* AGAL Accession Number NM02/32225 in a method according to any of claims to 36 to 48.

72. The use of *Coriolus vesicular* AGAL Accession Number NM02/32225 in a method according to any of claims to 50 to 67.